

What is claimed is:

1. A communications system used in a network where a plurality of communication nodes are connected,
5 comprising:

a digital wrapper unit, which is provided in each of the plurality of communication nodes, transmitting/receiving a digital wrapper frame;

a converting unit, which is provided in each of
10 first and second communication nodes among the plurality of communication nodes, performing mutual conversion between data in a predetermined format and a digital wrapper frame; and

a network management unit managing states of the
15 plurality of communication nodes, wherein

said digital wrapper unit transmits to the second communication node a digital wrapper frame obtained by said converting unit in the first communication node in accordance with an instruction from said network
20 management unit, and

said converting unit, which is provided in the second communication node, converts the received digital wrapper frame into the data in the predetermined format.

2. The communications system according to claim 1, wherein

said network management unit comprises

a first storing unit storing topology
5 information that represents a connection relationship
among the plurality of communication nodes,

a second storing unit storing route
information that represents a communication route
connecting the first communication node and the second
10 communication node, and

a controlling unit giving an instruction to
a communication node involved in the communication route
based on the topology information and the route
information.

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3. The communications system according to claim 2, further comprising

a route determining unit determining a
communication route connecting the first communication
20 node and the second communication node by referencing
the topology information and previously stored route
information, and writing route information
corresponding to the newly determined communication
route to said second storing unit.

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4. The communications system according to claim 2, wherein:

said network management unit further comprises
a fault detecting unit detecting a location
5 where a fault occurs on the network, and
an updating unit updating the route
information stored in said second storing unit according
to the location where the fault occurs, which is detected
by said fault detecting unit; and
10 said controlling unit gives an instruction to a
corresponding communication node based on the route
information updated by said updating unit.

5. The communications system according to claim 2, wherein:

said network management unit manages information
for using communication resources of respective lines
between the plurality of communication nodes as first
and second paths; and
20 said controlling unit gives to a corresponding
communication node an instruction for setting up the
communication route by using the first path if a fault
is not detected on the network, and gives to a
corresponding communication node an instruction for
25 setting up a bypass route by using the second path

according to a location where a fault occurs if the fault is detected on the network.

6. The communications system according to
5 claim 2, wherein:

said network management unit further comprises
a determining unit determining whether or
not to set up a bypass route according to a type of a
signal transmitted via a communication route when a
10 fault occurs on the communication route connecting the
first communication node and the second communication
node, and

an updating unit updating the route
information stored in said second storing unit if said
15 determining unit determines to set up a bypass route;
and

said controlling unit gives an instruction to a
corresponding communication node based on the updated
route information when the route information is updated
20 by said updating unit.

7. The communications system according to
claim 6, wherein

said determining unit determines not to set up a
25 bypass route if a communication route on which a fault

occurs is an SDH network or a SONET network.

8. The communications system according to claim 6, wherein

5 said determining unit determines to set up a bypass route if a communication route on which a fault occurs is an Ethernet system.

9. The communications system according to claim 1, wherein:

 a line between the plurality of communication nodes is a WDM transmission line; and

 each of the plurality of communication nodes further comprises a multiplexing unit transmitting
15 digital wrapper frames that store different data in parallel.

10. The communications system according to claim 9, wherein

20 each of the plurality of communication nodes further comprises an equalizing unit equalizing a WDM signal.

11. The communications system according to claim 10, wherein

said equalizing unit is a variable optical attenuator attenuating WDM light, and a controlling circuit controlling the variable optical attenuator.

5 12. The communications system according to claim 10, wherein

said equalizing unit is an optical amplifier amplifying WDM light, and a controlling circuit controlling the optical amplifier.

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13. A communication device as one of a plurality of communication devices, which is used in a network where the plurality of communication devices are connected, comprising:

15 first, second, and third optical splitters respectively splitting optical signals that are respectively received via first, second, and third optical input lines;

20 a first optical switch selecting one of the optical signals output from said second optical splitter and said third optical splitter, and guiding the selected optical signal to a first optical output line;

25 a second optical switch selecting one of the optical signals output from said first optical splitter and said third optical splitter, and guiding the

selected optical signal to a second optical output line;

a third optical switch selecting one of the optical signals output from said first optical splitter and said second optical splitter, and guiding the

5 selected optical signal to a third optical output line;

a processing unit processing an overhead of a digital wrapper frame that is transmitted via the first optical input line and the first optical output line; and

10 a controlling unit controlling said first, second and third optical switches in accordance with an instruction for setting up a communication route via the plurality of communication devices.

15 14. The communication device according to claim 13, further comprising:

a unit storing data, which is received via the second or the third optical input line, in a payload of a digital wrapper frame, and guiding the frame to
20 said processing unit; and

a unit extracting data from a payload of a digital wrapper frame terminated by said processing unit, and guiding the data to the second or the third optical output line.

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15. A network management device managing a network where a plurality of communication nodes are connected, comprising:

5 a first storing unit storing topology information that represents a connection relationship among the plurality of communication nodes;

a second storing unit storing route information that represents a communication route connecting first and second communication nodes among the plurality of
10 communication nodes, each of the first and second communication nodes comprising a converting unit performing mutual conversion between data in a predetermined format and a digital wrapper frame; and

a controlling unit giving an instruction for
15 transmitting a digital wrapper frame to a communication node involved in the communication route based on the topology information and the route information.

16. The network management device according to
20 claim 15, further comprising:

a fault detecting unit detecting a location where a fault occurs on the network; and

an updating unit updating the route information stored in said second storing unit according to the
25 location where the fault occurs, which is detected by

said fault detecting unit, wherein

said controlling unit gives an instruction to a corresponding communication node based on the route information updated by said updating unit.